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Water Reptiles of the Past and Present. By S. W. WILLISTON, of the University of Chicago. Chicago: The University of Chicago Press, 1914. Pp. 251, text fig. 131.

It is a deplorable fact, but nevertheless true, that the popular knowledge of present-day reptilian life is very limited. In the opinion of the author of this volume: "In most persons the word reptile incites only feelings of disgust and abhorrence; to many it means a serpent, a cold, gliding, treacherous, and venomous creature shunning sunlight and always ready to poison."

Naturally the public's knowledge of extinct reptiles is much more fragmentary and usually confined to inflated newspaper accounts of "monster" dinosaurs, and a few other forms, possibly. In this volume the author attempts to make the reader familiar with one of the most interesting phases of reptilian life, perhaps, the aquatic forms and the modifications that fitted them for this mode of life. Chaps. i-vi define, in an unpretentious manner, the Reptilia and tell of their occurrence in the rocks and their collection and restoration, their anatomy and classification, their distribution geographically and geologically, and the laws some of them have followed in their adaptation to a life in the water. A classification is given in chap. ii that conforms in the main with the ideas of the more conservative paleontologists. The class is divided into the following orders: the Cotylosauria, Chelonia, Theromorpha, Therapsida, Sauropterygia, Ichthyosauria, Squamata, Rhynchocephalia, Parasuchia, Crocodilia, Dinosauria, and Pterosauria. To these the Proganosauria, the Protorosauria, and the Thalattosauria are added and are provisionally given ordinal rank. Chaps. vi-xvi take up in order the Sauropterygia, Anomodontia, Ichthyosauria, Proganosauria, Protorosauria, Squamata, Thalattosauria, Rhynchocephalia, Parasuchia, Crocodilia, and the Chelonia. The various changes these forms have undergone in their adaptation to a life in water, their habits, and, in many cases, interesting bits of history connected with the discovery of the specimens, are told in a fascinating manner.

A few inaccuracies occur in the text and the lettering of some of the figures and some minor additions might be suggested. Among the vertebrate localities given on p. 52 should be included the Pennsylvanian beds from which Case has described vertebrates (*Ann. Carnegie Mus.*, IV [1908]), and on p. 54 might be mentioned the Hallopus beds of Marsh in connection with the Lower Jurassic.

One of the noteworthy features of the book is the large number of excellent illustrations which are, for the most part, the work of the

author. Especially interesting are the life-restorations, some of which are here published for the first time. There is no one better fitted to discuss the subject-matter contained in this book than the author of this volume. In it he gives to the public the benefit of his observations gathered from over forty years of actual experience in the reptilian field. It is rare indeed that a subject is given such an authoritative, scientifically exact treatment combined with a style so thoroughly understandable and interesting to the non-scientific reader. The work is sure to be very popular with the scientist and the general public alike.

M. G. MEHL

The Climatic Factor as Illustrated in Arid America. By ELLSWORTH HUNTINGTON, Assistant Professor of Geography in Yale University, with contributions by CHARLES SCHUCHERT, ANDREW E. DOUGLASS, and CHARLES J. KULLMER. Carnegie Institution of Washington, Publication No. 192, 1914. Pp. vi + 341, plates 12, maps 2, text figs. 90.

This volume has bearings which make it important to the geographer, historian, archeologist, meteorologist, and geologist, occupying a field where all these sciences meet, but in this review the volume will be discussed from the geological point of view only.

The purpose of the work is to determine the degree to which climatic changes have taken place in southwestern America during the past 2,000 to 3,000 years. In arid and semi-arid regions the amount of rainfall, as affected by pulsatory changes of climate, becomes most variable and critical.

In addition to the study of the climatic changes shown by the expansion and restriction of ancient peoples in America, as controlled by changes in water-supply or vegetation, the present volume contains two novel lines of attack. The first of these is the use of river terraces as evidences of minor climatic changes occurring within the past few centuries as well as in the more distant past. The second is the measurement of the growth rings of trees. Professor A. E. Douglass gives an introductory chapter on a method of estimating rainfall by the growth of trees. He shows that the rings vary in thickness and correlates the rate of growth with the records of rainfall. Following this, Huntington enters upon a most interesting discussion of the curve of growth of the giant redwoods of California. The data were obtained by careful measurements from stumps and extend back with a large number of trees as much as 2,000 years, with a few trees to 3,000 years. The geological importance of this work is readily seen. As Lyell showed that the present is the key to the past in the crustal history of the earth, similarly the key to the climatic history is to be found in the study of the present climates and